CYLINDER AND PISTON FOR EXPRESSING PLANT OR INSECT JUICES

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This apparatus is used for expressing the sap of pea and alfalfa plants and the body fluid of aphids for determining the pH and sap concentration.

It consists of cylinder, piston, and collecting basin (fig. 1). The whole press is 6¼ inches tall by 3½ inches in diameter.

Cylinder.--The cylinder is 4 inches tall by 3½ inches in diameter and is made of ¼-inch steel. Inside it is 3⅜ inches deep by 3 inches in diameter, bored true for even movement of the piston. The bottom of the cylinder is ¾ inch thick, with a ⅛-inch step machined out for fitting on the collecting basin. The bottom has thirty-five 3/16-inch holes well distributed on the outside. These extend from the outside for ⅝ inch, and for the remaining ⅛ inch the holes are bored 0.030 inch in diameter.

Piston.--The piston assembly is 4⅞ inches long. The piston proper is 2 inches deep; the diameter is practically 3 inches, but is machined to give a close sliding fit in the cylinder. The clearance is about 0.002 inch.

A saucer is machined in the top of the piston proper, 3/16 inch deep, to catch sap which is forced up by the piston. The bottom of the piston is flat.

The shank of the piston is 2½ inches long by 1½ inches in diameter. The end of the shank is machined to a flat cone.

Collecting basin.--On the outside the basin is 1-7/16 inches tall by 3½ inches in diameter. On the inside it is 1⅛ inches deep by 2¾ inches in diameter. The wall is ⅜ inch thick. A rim of ⅛ inch is machined in the top, which allows the cylinder to set in, making a close fit. The wall is notched to facilitate pouring sap.

Technic.--A piece of fine bronze wire screen sold as strainer cloth for milk funnels, of the same diameter as the inside of the cylinder, is placed in the bottom of the cylinder partially to prevent coarse particles from clogging the fine holes. Plant material is well wrapped in one thickness of cheesecloth before being placed in the cylinder.

Before pressure is applied, the piston should be pushed by hand at least half way down the cylinder in order that the piston may go straight.

In the hydraulic press available at this station, a high pressure of 25 tons per square inch is available, and under this pressure it is possible to extract from 50 to 75 cubic centimeters of sap from one pressing of alfalfa foliage. Practically all of the sap flows through into the collecting basin, although small amounts may collect in the saucer on top of the piston.

Figure 1.--Parts of apparatus for expressing plant and insect juices. A, collecting basin; B, piston; C, cylinder.

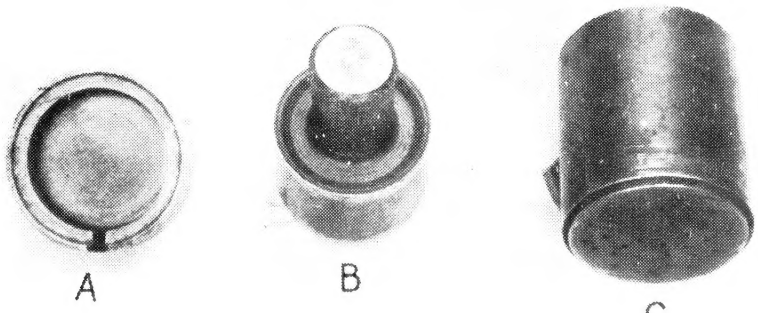

Fig.1